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7

8   wherein the at least one antenna element comprises a traveling wave antenna supporting a

9   phase velocity greater than the speed of light and, wherein the antenna structure supports

10   a cigar-like directional three-dimensional beam pattern and a butterfly wing-like directional

11   three-dimensional beam pattern.

1   5.   (Previously Presented) The antenna structure of Claims 3 or 4, wherein the

2   at least one antenna element is positioned at an angle from the symmetrical ground plane.

1   6.   (Original) The antenna structure of Claim 5, wherein the angle is about 90

2   degrees with respect to the x-, y- and z- axes.

1   7.   (Previously Presented) The antenna structure of Claims 3 or 4, wherein the

2   at least one antenna element is coupled with the symmetrical ground plane by means of an

3   unbalanced impedance.

1   8.   (Original) The antenna structure of Claim 7, wherein the unbalanced

2   impedance comprises a coaxial cable.

1   9.   (Original) The antenna structure of Claim 7, wherein a first conductor of

2   the unbalanced impedance mechanically couples the at least one antenna element with the

3   symmetrical ground plane.

3

1   **10.**   (Previously Presented) The antenna structure of Claims 3 or 4, wherein the
2   symmetrical ground plane is disk shaped.

1   **11.**   (Canceled)

1   **12.**   (Canceled)

1   **13.**   (Currently Amended) An antenna structure comprising:
2
3   an array of at least two antenna elements, each antenna element having at least one
4   taper;
5
6   a symmetrical finite ground plane;
7
8   and
9
10   an unbalanced impedance for coupling the array of at least two antenna elements
11   with the symmetrical ground plane;
12
13   wherein at least one antenna element of the array comprises a traveling wave antenna
14   supporting a phase velocity greater than the speed of light and wherein the taper of at least
15   one antenna element of the array comprises a linear profile, a linear constant profile, a
16   broken-linear profile, an exponential profile, an exponential constant profile, a tangential
17   profile, a step-constant profile, or a parabolic profile.

1   **14.**   (Currently Amended) An antenna structure comprising:

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3   an array of at least two antenna elements, each antenna element having at least one

4   taper;

5

6   a symmetrical finite ground plane;

7

8   and

9

10   an unbalanced impedance for coupling the array of at least two antenna elements

11   with the symmetrical ground plane;

12

13   wherein at least one antenna element of the array comprises a traveling wave antenna

14   supporting a phase velocity greater than the speed of light and wherein each antenna

15   element of the array supports a cigar-like directional three-dimensional beam pattern and a

16   butterfly wing-like directional three- dimensional beam pattern.

1   15.   (Previously Presented) The antenna structure of Claims 13 or 14, wherein

2   each antenna element of the array is positioned at an angle from the symmetrical ground

3   plane.

1   16.   (Original) The antenna structure of Claim 15, wherein the angle for each

2   antenna element is about 90 degrees with respect to the x-, y- and z- axes.

1   17.   (Previously Presented) The antenna structure of Claims 13 or 14, wherein

2   the unbalanced impedance comprises a coaxial cable.

5

1   **18.**   (Original) The antenna structure of Claim 17, wherein a first conductor of

2   the unbalanced impedance mechanically couples each antenna element of the array with

3   the symmetrical ground plane.

1   **19.**   (Previously Presented) The antenna structure of Claims 13 or 14, wherein

2   the symmetrical ground plane is disk shaped.

1   **20.**   (Previously Presented) The antenna structure of Claims 13 or 14, further

2   comprising a slow wave antenna to widen the directivity of the antenna structure.

1   **21.**   (Canceled)

1   **22.**   (Currently Amended) An apparatus comprising:

2

3   a transceiver; and

4

5   an antenna structure for radiating or capturing electromagnetic energy from or to

6   the transceiver comprising:

7

8   at least one antenna element having at least one taper, the taper comprising

9   a linear profile, a linear constant profile, a broken-linear profile, an

10   exponential profile, an exponential constant profile, a tangential profile, a

11   step-constant profile, or a parabolic profile;

12

13   a symmetrical disk shaped finite ground plane, the at least one antenna element

14   being positioned at an angle from the symmetrical disk shaped finite ground plane;

6

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15

16   and

17

18   an unbalanced impedance for coupling the at least one antenna element

19   with the symmetrical disk shaped finite ground plane;

20

21   wherein the at least one antenna element comprises a traveling wave antenna supporting a

22   phase velocity greater than the speed of light and wherein the at least one antenna element

23   supports a cigar-like directional three-dimensional beam pattern and a butterfly wing-like

24   directional three- dimensional beam pattern.

1   **23.**   (Previously Presented) The antenna structure of Claim 22, wherein the

2   angle is about 90 degrees with respect to the x-, y- and z- axes.

1   **24.**   (Previously Presented) The antenna structure of Claim 22, wherein the

2   unbalanced impedance comprises a coaxial cable.

1   **25.**   (Previously Presented) The antenna structure of Claim 22, wherein a first

2   conductor of the unbalanced impedance mechanically couples the at least one antenna

3   element with the symmetrical ground plane.

1   **26.**   (New) The antenna structure of Claim 20, wherein said slow wave antenna

2   is positioned at a greater distance from said ground plane than said antenna elements.

7

1   **27.**   (New) The antenna structure of Claim **3, 4 or 22**, wherein the distance

2   between the lower edge of said at least one antenna element and said ground plane is

3   tapered.

1   **28.**   (New) The antenna structure of Claim **13 or 14**, wherein the distance

2   between the lower edge of each of said at least two antenna elements and said ground

3   plane is tapered.

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